

REMARKS

With the entry of the foregoing amendments, claims 1-9 and 11-34 are pending in the application. Favorable consideration is requested.

Claim 1 has been amended to further clarify the invention as supported by the specification, for example, on page 2, lines 27-29. Claim 6 has been similarly amended. New claim 12 is a rewritten form of original claim 10 and also is supported by original claim 11 as well as the corresponding portions of the specification. Claim 10 has been cancelled without prejudice. New claim 13 is based on original claim 1 as well as the specification, for example, page 2, lines 6-11. The unit of measurement g/mol has been added for consistency with the rest of the application. For example, on page 2, lines 20-32 of the specification, various molecular weight values are reported for the polyamide polymer and oligomer, all with the measurement units g/mol, except for the value of 7500, which those skilled in the art understand to be g/mol. The specification has been amended to correct this error.

New claims 14-23 have been added to depend from new claim 13, and are supported by the specification and original claims 2-11. New claim 24 is based on original claim 1 and the specification, for example, page 8, lines 13-20. New claims 25-34 depend from new claim 24 and are supported by the specification and original claims 1-11.

No new matter has been added by the claim amendments.

Claim 10 stands rejected under 35 U.S.C. 101 because the claimed invention is allegedly directed to non-statutory subject matter. Without acquiescing in the rejection, applicant has cancelled claim 10 without prejudice and has added claim 12 in place thereof, as supported by original claims 10 and 11. Applicant submits that claim 12 renders the rejection moot.

Claims 1-11 stand rejected under 35 U.S.C. 102(b) as allegedly being anticipated by BASF EP 416 430. Without agreeing with the rejection or acquiescing in the positions set forth in the Office Action, claim 1 has been amended to clarify the subject invention and to further distinguish it from anything disclosed or suggested in any prior art reference.

Applicant submits that amended claim 1 and the claims depending therefrom are not anticipated by anything disclosed in EP 416 430. In contrast to the claimed invention, the cited reference does not disclose polymer compositions comprising two polyamides and a halogen-free flame retardant, of which one of the polyamides has a weight of at least 10,000 g/mol and the polyamide oligomer has a weight of at most 4000 g/mol. The cited reference simply does not describe a polyamide oligomer with a weight-average molecular weight of at most 4000 g/mol. Thus, claim 1 and the claims depending therefrom are not anticipated by the cited reference.

Also, new claim 13 is not anticipated by the cited reference because the claimed content of the flame retardant is above 25 parts by weight and the content of the oligomer is above 10 parts by weight, relative to 100 parts by weight of the polyamide. The cited reference does not disclose (or suggest) the claimed polyamide compositions comprising a combination of a polyamide polymer, a polyamide oligomer and a halogen free flame retardant, with the flame retardant and oligomer being present in the claimed amounts. For similar reasons, new claim 24 is not disclosed by the cited reference. Thus, applicant requests the withdrawal of the section 102(b) rejection.

Claims 1-11 stand rejected under 35 U.S.C. 103(a) as allegedly being obvious over BASF EP 0 416 430. Applicant respectfully submits that the rejection does not set forth a prima facie case of obviousness for at least the following reasons.

The claimed invention relates to the problem of the limited stability of halogen free flame retardants during processing of flame retardant polyamide compositions. According to the claimed invention, this problem is solved by using the specific combination of certain polyamide polymers, halogen free flame retardants, and polyamide oligomers.

In contrast, the cited reference does not concern the problem or the solution discussed and covered by the subject application. Instead, the cited reference relates to the problem of the workability of combinations of polyamides (A) and polyphenylene ethers (B). The cited reference solves its problem by using thermotropic liquid crystalline polymers (C). (In this regard, applicant will soon submit a machine translated copy of the cited reference for the Examiner's consideration.) Thus, the cited reference relates to a completely different problem and approach that does not disclose or remotely suggest the claimed invention. In fact, the claimed invention and its related problem are never addressed or even appreciated by the cited reference.

More specifically, the cited reference describes polymer compositions comprising a polyamide (A) and a thermotropic liquid crystalline oligomer or polymer (C) and optionally comprising a flame-retardant (G). In the cited reference, the polyamide (A) can have a molecular weight of at least 5000 g/mol, although the typical values mentioned in the examples of the cited reference are 18,000 and 22,000 g/mol. Component (C) in the cited reference can be an oligomer or polymer, but there is no specific disclosure in the cited reference relating to the molecular weight of these oligomers or polymers. Thus, the cited reference does not disclose or suggest the claimed invention with the particular components and the particular molecular weights. Moreover, the flame retardant (G) is an optional feature of the cited reference and is not a required feature as in the claimed invention.

In summary, claim 1 differs from the cited reference by the combination of a polyamide polymer having a weight average molecular weight of at least 10,000 g/mol, a halogen flame retardant, and a polyamide oligomer having a weight average molecular weight of at most 4000 g/mol, and wherein the halogen-free flame retardant is a halogen free phosphorous containing flame retardant. Accordingly, applicant requests the withdrawal of the obviousness rejection based upon the cited reference.

Claims 1-11 stand rejected under 35 U.S.C. 103(a) as allegedly being obvious over Koning (U.S. Patent 6,548,591) in view of Martens (U.S. Patent 5,618,865), Kasowski (U.S. Patent 6,025,419) or Cosstick (U.S. Patent 6,166,114). In response, applicant respectfully submits that the rejection does not set forth a prima facie case of obviousness.

The objects of the present invention are to improve both the flow and the mechanical properties of commercially viable halogen free flame retardant polyamide compounds. The claimed compounds provide a polyamide composition that has excellent outer appearance and good mechanical properties compared to prior art compounds. The superior and unexpected results of the claimed invention result from the use of a polyamide polymer having a weight average molecular weight of at least 10,000 g/mol, a halogen-free phosphorous containing flame retardant, and a polyamide oligomer having a weight average molecular weight of at most 4000 g/mol (claim 1).

The cited references either individually or in any reasonable combination do not disclose or suggest the claimed invention, nor do they address the problems that are targeted by the claimed invention. Koning simply discloses high molecular weight polyamides and low molecular weight polyamides with the addition of flame retardants as shown in column 3, line 51. Koning also refers to Japanese reference JP-A-5214246. According to Koning, and in

agreement with the description of the subject application on page 1, lines 10-21, the Japanese reference describes compositions comprising 100 parts by weight of a polyamide polymer and 0.001 - 10 parts by weight of a specific polyamide oligomer. Koning mentions as one of the drawbacks of the Japanese reference the insufficient retention of mechanical properties after addition of a polyamide oligomer, apart from the difficult preparation thereof, and the lack of commercial availability. Koning therefore teaches that the problem of mechanical property retention of the Japanese reference can be solved by using a specific selection of polyamide oligomers, i.e., polyamide oligomers having a melting temperature higher than the temperature of the polyamide polymer (see claim 1 of Koning). Koning does not mention anything about the specific problems relating to the triazine flame retardants disclosed in the Japanese reference. Instead, flame retardants are generally mentioned in Koning merely as examples of optional components of the composition. Koning does not mention any details about the types of flame retardants, the amounts that can be used, or their effects on any of the components in any combination. Thus, there is no teaching, suggestion or motivation in Koning to modify its disclosures with any of the secondary references to arrive at the claimed invention.

Indeed, Koning teaches away from the claimed invention or at least in another direction than the claimed invention because Koning teaches one skilled in the art that the problem with mechanical property retention is solved by using a specific selection of polyamide oligomers having melting temperatures higher than the temperatures of the polyamide polymers. As further evidence that Koning teaches those skilled in the art to go in a different direction, the polyamide oligomers of the claimed invention have melting points that are even lower than that of a polyamide polymer (see, for example, page 11, lines 11-15) -- which is contrary to the teachings of Koning.

Furthermore, the use of a high amount of flame retardant is normal to achieve a required flame retardancy level. Achieving both good flow and good mechanical properties is more difficult, even when using a polyamide oligomer as disclosed in the Japanese reference mentioned in Koning and as mentioned in the subject application. The subject invention takes a different approach and yields an invention that results in polyamide compounds having a good outer appearance and having mechanical properties that are superior to the mechanical properties of a corresponding compound without a polyamide oligomer. Moreover, in the claimed invention and unlike anything disclosed or suggested in the prior art, good outer appearance and improved mechanical properties are not only achieved with a content of flame retardant above 25 parts by weight, and even above 30 parts by weight, relative to the 100 parts by weight of the polyamide polymer, but even with a polyamide oligomer content above 10 parts by weight, and more particularly above 12 parts by weight, relative to the 100 parts by weight of the polyamide polymer. See, for example, independent claim 13 and page 2, lines 1-11, of the specification.

The improved results of the claimed invention are shown in Tables I and II of the present application. This evidence of unexpected and superior results further demonstrates the non-obviousness of the claimed invention. And, as noted above, these superior results are achieved with a polyamide oligomer having a melting point lower than that of a polyamide polymer (see, for example, page 11, lines 11-15 of the application) -- in contrast to the teachings of Koning -- the primary reference. The secondary references do not teach otherwise, and modifying Koning to eliminate Koning's temperature requirement would defeat the purpose of the primary reference -- which is not permitted in an obviousness analysis.

In summary, there is no reason why a person skilled in the art would have a reasonable expectation of success of choosing a flame retardant composition from any of the secondary

OTTENHEIJM
Appl. No. 10/538,637
June 20, 2007

references and combining such a composition with a polyamide oligomer as required by Koning. Nor would a person skilled in the art expect there to be improved results when modifying Koning in this improper way. Thus, the claimed invention is not obvious in view of the primary reference of Koning in any reasonable combination with the secondary references.

In view of the foregoing amendments and remarks, applicant submits that the claimed invention is novel and non-obvious. A favorable notice of allowance is requested.

If the Examiner has any questions concerning this case, please feel free to contact the undersigned at 703-816-4009.

Respectfully submitted,

NIXON & VANDERHYE P.C.

By:



Duane M. Byers
Reg. No. 33,363

DMB:lfo
901 North Glebe Road, 11th Floor
Arlington, VA 22203-1808
Telephone: (703) 816-4000
Facsimile: (703) 816-4100